Lifestyle interventions in patients with a severe mental illness

Looijmans, Anne

Chapter 10

General Discussion

Patients with a severe mental illness (SMI) experience, besides a range of disturbing psychiatric symptoms influencing their functioning and wellbeing, (chronic) physical illnesses up to four times more often than adults in the general population[1]. Since SMI patients' unhealthy lifestyle behaviors contribute to their alarming physical health, targeting these lifestyle behaviors offers a window of opportunity to improve their health and wellbeing. According to the health model of Lalonde, health is influenced by human biology, lifestyle, the environment and health care systems[2] (see **Figure 1** in the Introduction). Therefore, in setting up attainable lifestyle interventions for SMI patients, we should take into account environmental and societal factors[2] and adapt to the real-world setting of mental health care practice[3]. This thesis aimed to study how lifestyle behaviors in SMI patients could be improved in regular mental health care settings in order to improve the physical health of this population.

Main findings of two pragmatic lifestyle trials: the ELIPS and LION studies

In this thesis, we have described two pragmatic randomized controlled trials in which we targeted patients' obesogenic environment and self-management skills. In the Effectiveness of Lifestyle Interventions in PSychiatry (ELIPS) trial, we targeted small changes in the obesogenic environment of residential patients with regard to diet and physical activity. An intervention directed at the obesogenic environment of SMI patients, without explicitly targeting individual patients' lifestyle behaviors, can already lead to small improvements in physical health (**Chapter 3**) and physical fitness (**Chapter 5**). The intervention slightly lowered patients' quality of life (**Chapter 4**), although this may be due to higher baseline levels of quality of life in the intervention group. In evoking changes, the role of the implementer of the intervention seems crucial: it was difficult to evoke new and/or maintain the achieved improvements when the original implementers left and regular staff members took over the intervention (**Chapter 3 & 5**). In the Lifestyle Interventions for severe mentally ill Outpatients in the Netherlands (LION) trial, we facilitated mental health nurses with training in motivational interviewing and a web tool to target (motivation to change) lifestyle behaviors in SMI outpatients by increasing patients' self-management. This approach did not lead to improvements in patients' physical health, although patients' motivation to change dietary habits increased (**Chapter 7**). This could be considered the first step in behavioral change. Cost-effectiveness analyses showed that the justification to implement this lifestyle intervention cannot be found in a short term financial advantage (**Chapter 8**). Rather, the unmet needs of the patient population and potential long-term health gains should be valued as important factors in the decision to implement lifestyle interventions in clinical mental health practice.

Taking lifestyle serious: the need for a lifestyle medicine discipline

When setting up the ELIPS trial in 2010, eyebrows were raised and some care professionals were skeptical regarding the benefits of lifestyle on physical health and whether this would be achievable in such a severely mentally ill population. During both the ELIPS and LION trial, many professionals saw lifestyle coaching as something voluntary and additional. However, the impact of lifestyle on physical illnesses is convincing: healthy lifestyle factors can potentially prevent 93% of diabetes, 81% of heart attacks, 50% of strokes and 36% of all cancer types[4]. In recent years, professionals and the general population are becoming aware of the impact and importance of lifestyle interventions and are now slowly starting to acknowledge that lifestyle may need its own discipline, called 'lifestyle medicine'[5-7]. Lifestyle medicine is described as '*…a branch of evidence-based medicine in which comprehensive lifestyle changes (including nutrition, physical activity, stress management, social support and environmental exposures) are used to prevent, treat and reverse the progression of chronic diseases by addressing their underlying causes*'[6] (p. 1289). It is a major step forwards to acknowledge that lifestyle needs a specified discipline as it limits its voluntarily and additional character. From now on, the health care system should aim for care trajectories in which lifestyle is an integral part of treatment, irrespective of whether you are waiting for a kidney transplantation, have diabetes or whether you have a (severe) mental illness. Lifestyle medicine is the answer to the questions raised on how to achieve 'normal' eating and activity behaviour in the current 'abnormal' environment, which leads to the high multi-morbidity in our modern society.

The question arises whether treating lifestyle in the SMI population differs from treating lifestyle in the general population. Of course, in treating SMI patients, we should respect symptoms of their mental illness such as a depressed mood, lack of initiative or having cognitive deficits[8] and the well-known side effects of antipsychotic medication. This requires professionals to have insight and skills in how to work along with these symptoms. SMI patients may experience difficulties in clear communication about physical complaints as a result of cognitive deficits[9], which requires professionals to rely more on physical measures. We should also understand that patients' experience of social isolation may withhold them from asking someone to go for a walk or joining a public gym. Since only a small number of SMI patients have a regular job, most of them miss out on the opportunities that employers offer to work on health issues and it limits patients' budgets to spend on healthy food products or sport equipment. However, these arguments may also apply to other populations such as elderly, persons with a cognitive impairment or persons with a low social-economic status. In general, many persons, with our without a certain disorder or disability, struggle to become and stay physically healthy. We should respect SMI patients' vulnerabilities, but if we experience too much empathy for the vulnerability of this population, we may withhold them from the care they need. And that is not helpful for anyone.

Changing physical health of the (SMI) population is a long-term endeavor: large efforts may result in seemingly small effects

It is important to acknowledge that efforts to implement lifestyle interventions and improve (physical) health in SMI patients seem large, while results in terms of improved physical health until now seem to be small (**Chapter 3**) or non-existing (**Chapter 7**). Before lifestyle interventions can be fully integrated in mental health care practice, changes in, among others, the environment and in implementers' (i.e. staff members) perceived psychosocial barriers (**Chapter 9**) are required. Enabling these changes will take a prolonged period of time. Therefore, in studying the effectiveness of lifestyle interventions, we should follow the example of the lifestyle studies in the field of diabetes, which often have a duration of three till six years[10,11]. We assume that prolonged implementation will result in structural embedding in daily clinical practice and create a feeling of ownership in staff members, instead of them labeling the intervention as an additional temporary routine for research purposes only. As one nurse in the LION study said "*We do it for the trial. When the trial has ended, we just start doing our own routines again*". Increased feelings of ownership will lead to structurally initiating and promoting (lifestyle) changes.

Another point we should be aware of is the fact that it takes time for patients to get motivated, to translate this motivation into actual behavior change, and for the healthy behaviors to eventually result in physical health gains. We should not be baffled by minimal results, but keep in mind that structurally changing the physical health of the (SMI) population is a long-term endeavor of which convincing results may only be visible after many years[12]. In that sense, the SMI populations does not differ from the general population.

Multiple benefits of lifestyle interventions

The focus of this thesis is on changing lifestyle behaviors with the aim to improve patients' physical health and by that possibly increase their life expectancy. One important advantage of tackling lifestyle is its impact on multiple disorders simultaneously, whereas pharmacotherapy, although effective in improving physical health parameters[13,14], mainly targets symptoms or risk factors of a single disorder.

From a medical perspective, lifestyle changes impact numerous (physical) health outcomes. Increasing physical activity can enhance mental wellbeing by improving mood and self-perceptions and decreasing depression and anxiety[15], and decrease the risk of cognitive decline and dementia[16]. Performing regular physical activity improves musculoskeletal fitness, which is increasingly related to lower risks of developing chronic diseases and improvements in overall health status and quality of life[17,18]. Changing lifestyle behaviors can decrease patients' prescribed doses of medication for illnesses such as diabetes, increased cholesterol levels or high blood pressure and in the most ideal situation, even prevent prescription at all. Quitting smoking can lead to reduced

doses of olanzapine and clozapine by 30% and 50%, respectively[19], and quitting caffeine intake can decrease doses of clozapine by 50%[20]. Lowering the number and/or dose of prescribed medication can decrease the side-effects experienced by patients, lower health care costs and even decrease environmental waste by means of less excretion of active pharmaceutical ingredients and disposal of unwanted leftovers[21].

Another advantage of tackling lifestyle is its influence on many other important domains in patients' lives. Even when lifestyle changes do not directly lead to improved physical health outcomes, from a human being perspective, targeting lifestyle may contribute to a more fulfilling and meaningful life. Staff members and patients at one site in the ELIPS trial grouped together to practice for an official 15-20 kilometers walking tour in their province. Alongside the expected physical improvements, such an activity can provide participants with short and long-term goals, experiences of success, an increase in levels of confidence, social contacts, fresh air and sunlight (vitamin D), and it makes them part of the community. Healthy behaviors can also be integrated in wishes, goals or plans patients already have, instead of being the main goal. Health care professionals can guide patients to turn their wish or goal into a plan in which they integrate lifestyle activities. For example, a goal to get a (voluntary) job can be accompanied by thinking of active ways to get to the job (i.e. walking, by bike) and healthy options for the lunch taken. Therefore, the benefits of lifestyle interventions definitely outweigh the benefits of pharmacotherapy.

The largest benefit for patients to change their lifestyle could lie in their personal motivation. Whereas professionals may advocate for lifestyle interventions by summing up the expected physical health gains in terms of waist circumference, BMI or lab outcomes, patients could be highly motivated by the personal goals that drive them: "S*o I will be able to play with my grandchildren*", "*So I will be able to go to the supermarket by myself*" and "S*o I will feel pretty again*" (statements made by patients when asked for their motivation to target lifestyle - the LION trial).

METHODOLOGICAL ASPECTS

Pragmatic versus explanatory trials

Both the ELIPS and LION trial were designed as pragmatic (effectiveness) instead of explanatory (efficacy) trials, studying the interventions under usual rather than ideal circumstances[22]. The advantage of pragmatic trials is the increased external validity since outcomes indicate what is attainable in real-world settings. However, outcomes of interventions studied in pragmatic trials can be less convincing than outcomes of the same programs studied in explanatory trials. For example, in the field of diabetes, despite convincing results of certain diabetes prevention programs in explanatory trials, the effects of these programs were substantially lower when studied in daily practice[23]. In addition, in pragmatic trials it can be difficult to disentangle the effect of the intervention

itself from the effect the degree of implementation had on the outcomes. Therefore, I would highly recommend to include a process evaluation as a substantial component of pragmatic trials or switch to a combined design in which the clinical effectiveness and the implementation intervention or strategy are simultaneously tested, a so called 'Hybrid Type 2' design[24]. An advice for researchers and policy makers would be to pay attention to the type of study design used when comparing the effectiveness of different (lifestyle) interventions.

Use of regular care data

The studies presented in this thesis used routine care data that were gathered for treatment purposes and were, by anonymizing the data, made available for scientific research. A huge advantage of using these data is the limited burden on patients, staff and budgets. The downside of using data collected for care purposes is the limited control over data collection and its quality. Several forms of bias may have influenced the quality of research and should therefore be addressed here.

First of all, bias may exist due to missing values. If we take the ELIPS trial (N=736) as an example of a large trial using Routine Outcome Monitoring (ROM) data for scientific purposes, we can conclude that missing values can range between 17% for blood pressure and 24% for waist circumference to 36% for lab outcomes. In approximately 10% of the cases, participants had a weight measure, but lacked a waist circumference measure. ROM nurses explained that measuring waist circumference can be a challenge, especially when male nurses have to conduct such an intimate physical measure with female patients. The high percentage of missing lab values is not surprising since lab measures request an additional effort to (plan to) visit a laboratory, even despite ROM nurses' efforts to stimulate and gently remind patients. However, we have used statistical methods that can handle missing data (i.e. multilevel linear mixed model analyses), therefore we have reduced bias by including as many participants as possible and not selecting only those with complete data. Another consequence of missing data is the potential misclassification of the metabolic syndrome. Our calculations showed that when physical or lab values were missing, classification based on medication use only would yield 43-50% misclassifications for HDL cholesterol and triglycerides. In order to limit misclassification bias, we have only classified those participants of whom at least the physical or lab value is known.

Secondly, in clinical practice, measurement variation may arise due to practical issues. For example, in measuring weight, patients wear more heavy clothes in winter as compared to summer or patients may refuse to take off their jacket or shoes. Differences in patients' height existed over multiple measurements, sometimes raising up to 8 centimeters, which questions whether standardized methods were used. Also, several methods exist to measure waist circumference: it can be measured in standing position at the end of an expiration using a non-stretching tape placed on 1. halfway between iliac crest and lowest rib, 2. at the umbilicus, 3. at the 'noticeable waist narrowing' or 4. just

above the right ilium on the midaxillary line[25,26]. Although ROM nurses are repeatedly trained and received clear instructions before conducting the measurements in the trials, variation in measurements could have arisen if pre- and post-measurements were conducted by, for example, newly introduced ROM nurses who may have used a slightly different method.

Third, it is plausible that report bias interfered in case of lab tests. For example, the fasting state of lab values should be routinely indicated on the lab form. Data of the ELIPS trial showed that 83% of the lab values were indicated as 'fasting' (≥8 hours after last meal), 7% were 'non-fasting' and in 10% of the cases the lab status was unknown. However, in practice, it is questionable whether participants that were indicated as having fasting lab values were actually fasting, when their lab visit was scheduled in the afternoon.

Finally, we should not forget the participant selection bias that occurs in data collection of ROM screenings in general. Data are stored for participants that actively participate in ROM screenings, therefore the SMI population that refuses ROM screenings are automatically excluded from trials based on regular care data. Limited data on the patients lacking ROM screenings exist, although preliminary analyses comparing ROM (PHAMOUS) data and administrative data from health care institutions in the Northern Netherlands (Psychiatric Case Register Northern-Netherlands) suggest that the patients who receive psychiatric care but do not participate in ROM (PHAMOUS), have lower health care costs, which may suggest that they are less severely mentally ill[27]. Of course, participant selection bias occurs in all RCTs collecting participant data as well.

WHERE TO GO FROM HERE: FUTURE PERSEPCTIVES

Based on all the experiences so far, where do we have to go from here? Many practical implications for the mental health care practice following this thesis are listed and described in detail in **Chapter 9**. If we want to ban diseases of prosperity such as obesity and diabetes in general, I am convinced that the most effective manner is to create an overall healthy living environment with limited unhealthy food products and substances, and with multiple situations that challenge individuals to be physically active. The government should play a crucial role in establishing such an environment, mainly by banning promotion of unhealthy food products. It is counterproductive that "For every US$1 spent by the WHO to improve nutrition, US$500 is spent by the food industry on promoting processed foods"[28]. Within the mental health care setting, government agencies should monitor the integration of somatic care into mental health care and reward or sanction based on the outcome. Without monitoring, rewards and sanctions, in my opinion, no structural changes can be expected in the mental health care setting. The necessity to take lifestyle more seriously in clinical practice and establish lifestyle medicine as a discipline means that it should be integrated in the regular educational program of future nurses and medical doctors, including psychiatrists. Since the applied

science profession 'lifestyle coach' is relatively new, we should integrate and root this profession within the mental health care teams. Lifestyle coaches' specific knowledge and skills, and the fact that lifestyle is their priority, are needed to support health care teams to integrate lifestyle in patients' treatment. We are (and should be!) working towards a future in which care professionals can no longer neglect lifestyle.

From now on, in designing interventions, we should intervene on multiple levels simultaneously as the key to successful lifestyle interventions in psychiatry lies in an interplay between (individual-based) interventions, the implementers of these interventions and the physical and organizational environment. This requires broad interventions and different study designs, for which collaboration with implementation scientists should be sought. We can investigate the value of, for example, Hybrid Type 2 study designs, which claim to combine the testing of clinical effectiveness of interventions and implementation strategies[24], and explore how this will work out in practice. As we have argued that improving lifestyle behavior may take a long period of time, we need study designs with a prolonged duration (e.g. 3-6 years) to test long-term outcomes of lifestyle interventions that have had time to sufficiently embed in clinical practice. Funding agencies will need to increase budgets and allow for longer project duration.

For measuring the effects of lifestyle interventions on actual behavior, objective measures for physical activity (e.g. Actigraph, pedometer) are available although measuring diet intake in this population is very difficult due to cognitive deficits and a potentially disabled insight. If future research can reveal a simple but objective measure to unravel dietary patterns and nutrient intake, it would be of utmost value for clinical practice and research. Finally, it would be of value to model the long-term gains that lifestyle interventions may have beyond potential physical health gains, in order to better estimate the expected societal gains, especially in a costly field like psychiatry.

CONCLUSION

Given the substantial contribution of unhealthy lifestyle behaviors to the worrisome physical health of patients with a severe mental illness, targeting lifestyle behaviors should be an integral part of the treatment in this population. Changing the obesogenic environment of residential SMI patients can already lead to improvements in physical health, although maintaining improvements is a challenge. An intervention addressing patients' self-management by using a lifestyle web tool, did not result in improvements in patients' physical health but increased patients' motivation to change dietary habits, which can be considered the first step in behavioral change. The key to successfully introducing and embedding healthy lifestyle in mental health care practice may lie in a combination of interventions focused on the individual patient, on the implementers of these interventions and on the living environment and organizational context. Along this course, we should not be baffled by minimal results, but keep in mind that structurally changing the physical health of the (SMI) population is a long-term endeavor.

REFERENCES

1. Hert M, Correll CU, Bobes J, et al. Physical illness in patients with severe mental disorders. I. prevalence, impact of medications and disparities in health care. *World Psychiatry*. 2011;10(1):52-77.
2. Lalonde M. *A new perspective on the Health of Canadians.A working document. Ottawa: Government of Canada, 1974*.
3. Treweek S, Zwarenstein M. Making trials matter: Pragmatic and explanatory trials and the problem of applicability. *Trials*. 2009;10(37):9.
4. Ford ES, Bergmann MM, Kroger J, Schienkiewitz A, Weikert C, Boeing H. Healthy living is the best revenge: Findings from the european prospective investigation into cancer and nutrition-potsdam study. *Arch Intern Med*. 2009;169(15):1355-1362.
5. Egger GJ, Binns AF, Rossner SR. The emergence of" lifestyle medicine" as a structured approach for management of chronic disease. *Med J Aust*. 2009;190(3):143.
6. Sagner M, Katz D, Egger G, et al. Lifestyle medicine potential for reversing a world of chronic disease epidemics: From cell to community. *Int J Clin Pract*. 2014;68(11):1289-1292.
7. van Winkelhof M., Pijl H. & Vliegenthart, M. Gezondere levensstijl is een onderschat medicijn voor de moderne mens. 3 April 2018. Available from: https://www.nrc.nl/nieuws/2018/04/03/aanpak-van-leefstijlziekten-levert-meer-op-a1598039.
8. American Psychiatric Association. *Diagnostic criteria from dsm-iv-tr.* American Psychiatric Pub; 2000.
9. Lambert TJ, Newcomer JW. Are the cardiometabolic complications of schizophrenia still neglected? barriers to care. *Med J Aust*. 2009;190(4):S39.
10. Tuomilehto J, Lindström J, Eriksson JG, et al. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med*. 2001;344(18):1343-1350.
11. Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med*. 2002;2002(346):393-403.
12. Saxena S, Maj M. Physical health of people with severe mental disorders: Leave no one behind. *World Psychiatry*. 2017;16(1):1-2.
13. Wu R, Zhao J, Jin H, et al. Lifestyle intervention and metformin for treatment of antipsychotic-induced weight gain: A randomized controlled trial. *JAMA*. 2008;299(2):185-193.
14. Lally J, O'Loughlin A, Stubbs B, Guerandel A, O'Shea D, Gaughran F. Pharmacological management of diabetes in severe mental illness: A comprehensive clinical review of efficacy, safety and tolerability. *Expert review of clinical pharmacology*. 2018;11(4):411-424.
15. Fox KR. The influence of physical activity on mental well-being. *Public Health Nutr*. 1999;2(3a):411-418.
16. Laurin D, Verreault R, Lindsay J, MacPherson K, Rockwood K. Physical activity and risk of cognitive impairment and dementia in elderly persons. *Arch Neurol*. 2001;58(3):498-504.
17. Warburton DE, Gledhill N, Quinney A. Musculoskeletal fitness and health. *Canadian journal of applied physiology*. 2001;26(2):217-237.
18. Warburton DE, Gledhill N, Quinney A. The effects of changes in musculoskeletal fitness on health. *Canadian Journal of Applied Physiology*. 2001;26(2):161-216.
19. Tsuda Y, Saruwatari J, Yasui-Furukori N. Meta-analysis: The effects of smoking on the disposition of two commonly used antipsychotic agents, olanzapine and clozapine. *BMJ Open*. 2014;4(3):e004216-2013-004216.

20. Farmacotherapeutisch kompas. https://www.farmacotherapeutischkompas.nl/bladeren/preparaatteksten/c/clozapine January, 2018.
21. Daughton CG, Ruhoy IS. Lower-dose prescribing: Minimizing “side effects” of pharmaceuticals on society and the environment. *Sci Total Environ*. 2013;443:324-337.
22. Thorpe KE, Zwarenstein M, Oxman AD, et al. A pragmatic-explanatory continuum indicator summary (PRECIS): A tool to help trial designers. *J Clin Epidemiol*. 2009;62(5):464-475.
23. Cardona-Morrell M, Rychetnik L, Morrell SL, Espinel PT, Bauman A. Reduction of diabetes risk in routine clinical practice: Are physical activity and nutrition interventions feasible and are the outcomes from reference trials replicable? A systematic review and meta-analysis. *BMC Public Health*. 2010;10(1):653.
24. Curran GM, Bauer M, Mittman B, Pyne JM, Stetler C. Effectiveness-implementation hybrid designs: Combining elements of clinical effectiveness and implementation research to enhance public health impact. *Med Care*. 2012;50(3):217-226.
25. Chumlea WC, Kuczmarski RJ. Using a bony landmark to measure waist circumference. *J Am Diet Assoc*. 1995;95(1):12.
26. Dobbelsteyn C, Joffres M, MacLean DR, Flowerdew G. A comparative evaluation of waist circumference, waist-to-hip ratio and body mass index as indicators of cardiovascular risk factors. the canadian heart health surveys. *Int J Obes*. 2001;25(5):652.
27. Konings S, Mierau J, Feenstra T. *The direct medical cost of schizophrenia in the Northern Netherlands.* https://stkonings.nl/research/papers/thesis.pdf, 2017.
28. Lake A, Townshend T. Obesogenic environments: Exploring the built and food environments. *The Journal of the Royal society for the Promotion of Health*. 2006;126(6):262-267.